List of Claims:

Claim 1 (Currently Amended): A method of reducing a quantization distortion created by quantization of a speech signal by a sample-by-sample quantizer, the speech signal including a plurality of frames, the method comprising:

detecting that one frame of the plurality of frames was previously quantized;

determining a quanitzation level for each of a plurality of samples of the one frame;

estimating an expected quantization distortion for each of the plurality of samples based on the quantization level of each of the plurality of samples;

summing up the expected quantized distortion of each of the plurality of samples to generate a summed quantization distortion; and

removing the summed quantization distortion from the one frame.

Claim 2 (Currently Amended): The method of claim 1, wherein the determining includes using quantization indices to determine the quantization ~~levels~~ level for each of a plurality of samples.

Claim 3 (Currently Amended): The method of claim 2, wherein the quantization indices are obtained by analyzing the one frame to determine a type of the sample-by-sample quantizer and requantizing the one frame.

Claim 4 (Cancelled)

Claim 5 (Currently Amended): The method of claim 1 where ~~the reduction of~~ reducing the quantization distortion is part of ~~the~~ a pre-processing of the speech signal prior to encoding.

Claim 6 (Currently Amended): The method of claim 1 where ~~the reduction of~~ reducing the quantization distortion is part of ~~the~~ a post-processing of the speech signal following decoding.

Claim 7 (Previously Presented): The method of claim 1, wherein the removing is performed in the frequency domain.

Claim 8 (Previously Presented): The method of claim 1, wherein the removing is performed in the time domain.

Claim 9 (Currently Amended): A method of reducing quantization distortion created by a sample-by-sample quantizer, the method comprising:

(a) determining quantization levels of a frame of a previously quantized signal;

(b) estimating an expected quantization distortion for each of the quantization levels;

(c) summing the expected quantization distortion for each of the quantization levels for the frame of the previously quantized signal; and

(d) removing the summed expected quantization distortion from the frame.

Claim 10 (Currently Amended): The method of claim 8 where (b) further comprises determining ~~the~~ a distribution of the previously quantized signal ~~quantized to each of~~ within the quantization levels and storing the expected quantization distortion in a distortion table.

Claim 11 (Currently Amended): The method of claim 8 where (c) further comprises assuming a magnitude spectrum of the expected quantization distortion is flat and assuming a phase spectrum of the expected quantization distortion is the same as the previously quantized signal.

Claim 12 (Previously Presented): The method of claim 9 further comprising initially determining if a signal has been subject to quantization by the sample-by-sample quantizer.

Claim 13 (Currently Amended): The method of claim 11 further comprising executing ~~the remainder of~~ the method after the initially determining if the signal has been subject to quantization by the sample-by-sample quantizer.

Claim 14 (Previously Presented): The method of claim 12 further comprising determining a type of sample-by-sample quantization.

Claim 15 (Currently Amended): The method of claim 8 where (a) further comprises quantizing ~~the~~ a signal with a sample-by-sample quantizer prior to determining the quantization levels.

Claim 16 (Original): The method of claim 9 where (d) further comprises removing the expected quantization distortion in the frequency domain.

Claim 17 (Original): The method of claim 9 where (d) further comprises removing the expected quantization distortion in the time domain.

Claim 18 (Currently Amended): A method of estimating quantization distortion for a frame of a signal that has been quantized using sample-by-sample quantization, the method comprising:

(a) determining ~~the~~ a distribution of the signal within a plurality of quantization levels;

(b) estimating an expected quantization distortion for each of the quantization levels based on the distribution;

(c) determining an expected quantization distortion for the frame as a function of the expected quantization distortion of each of the quantization levels;

(d) determining a phase spectrum of the expected quantization distortion of the frame.

Claim 19 (Previously Presented): The method of claim 18 further comprising (e) determining a spectral shape of the expected quantization distortion of the frame as a function of an error criterion used during the sample-by-sample quantization.

Claim 20 (Previously Presented): The method of claim 19 further comprising (f) approximating the spectral shape of the expected quantization distortion of the frame as flat.

Claim 21 (Cancelled)

Claim 22 (Previously Presented): The method of claim 18 further comprising (e) assuming that the phase spectrum of the expected quantization distortion of the frame is equal to the phase spectrum of the frame.

Claim 23 (Original): The method of claim 18 where (b) further comprises determining an upper boundary and a lower boundary for each of the quantization levels.

Claim 24 (Currently Amended): A method of reducing the quantization distortion created during quantization of a signal by a sample-by-sample quantizer, where a frame of the signal comprises a plurality of samples that are quantized to one of a plurality of quantization levels by the sample-by-sample quantizer, the method comprising:

(a) receiving the frame of the signal;

(b) identifying ~~the~~ a quantization level of each of the samples;

(c) obtaining ~~the~~ an expected quantization distortion of each of the samples;

(d) summing the expected quantization distortion of each of the samples ~~quantization levels of the frame~~; and

(e) removing the sum of the expected quantization distortion from the frame.

Claim 25 (Previously Presented): The method of claim 24 further comprising initially determining if the frame was previously quantized.

Claim 26 (Original): The method of claim 24 where (a) comprises receiving the signal with a base station.

Claim 27 (Original): The method of claim 24 where (a) comprises receiving the signal with a mobile communication device.

Claim 28 (Original): The method of claim 24 where (a) comprises receiving the signal with a public switched telephone network.

Claim 29 (Original): The method of claim 24 where (a) comprises receiving the signal from a communication medium.

Claim 30 (Original): The method of claim 24 where (a) comprises receiving the signal with a packet-based network.

Claim 31 (Original): The method of claim 24 where (c) further comprises determining a distribution of the samples within the quantization levels.

Claim 32 (Original): The method of claim 24 where (d) further comprises determining a magnitude spectrum of the expected quantization distortion, and determining a phase spectrum of the expected quantization distortion.

Claim 33 (Original): The method of claim 24 where the quantization levels are obtained from the signal without additional processing.

Claim 34 (Original): The method of claim 24 where (b) further comprises re-quantizing the signal.

Claim 35 (Original): The method of claim 24 where (c) further comprises retrieving the expected quantization distortion from a distortion table.

Claim 36(Original): The method of claim 24 where (e) further comprises removing the expected quantization distortion in the frequency domain.

Claim 37 (Original): The method of claim 24 where (e) further comprises removing the expected quantization distortion in the time domain.

Claim 38 (Currently Amended): A distortion removal system for a frame of a signal that includes quantization distortion resulting from the frame being previously quantized to a plurality of quantization levels by a sample-by-sample quantizer, the distortion removal system comprising:

a distortion identification module operable to identify an expected quantization distortion for each of the quantization levels in the frame;

a summer module operable to sum the expected quantization distortion of each of the quantization levels in the frame; and

a distortion removal module operable to remove the summed expected quantization distortion.

Claim 39 (Original): The distortion removal system of claim 38 further comprising an initial processing module operable to determine and provide the quantization levels to the distortion identification module.

Claim 40 (Original): The distortion removal system of claim 39 where the initial processing module further comprises a sensing module and a quantization module.

Claim 41 (Original): The distortion removal system of claim 38 where the distortion identification module comprises a distortion determination module and a distortion table.

Claim 42 (Original): The distortion removal system of claim 38 where the distortion removal system is operable to pre-process the signal prior to encoding.

Claim 43 (Original): The distortion removal system of claim 38 where the distortion removal system is operable to post-process the signal following decoding.

Claim 44 (Original): The distortion removal system of claim 38 where the distortion removal module is operable to remove the expected quantization distortion in the frequency domain.

Claim 45 (Original): The distortion removal system of claim 38 where the distortion removal module is operable to remove the expected quantization distortion in the time domain.